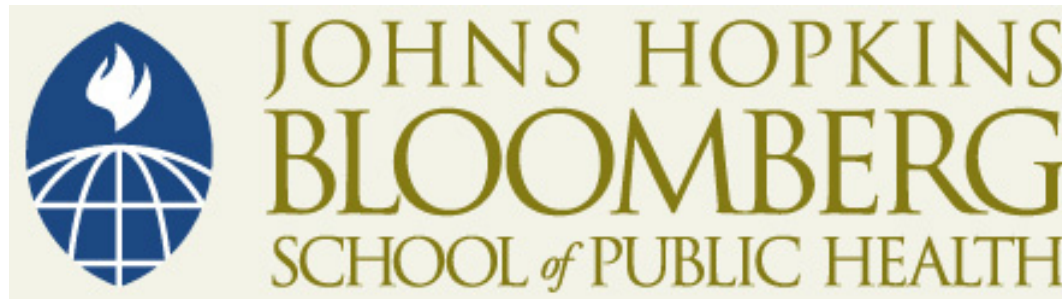


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# **Mortality and Morbidity Trends and Differentials**

**Determinants and Implications for the  
Future**

**Module 7a**

# Learning Objectives

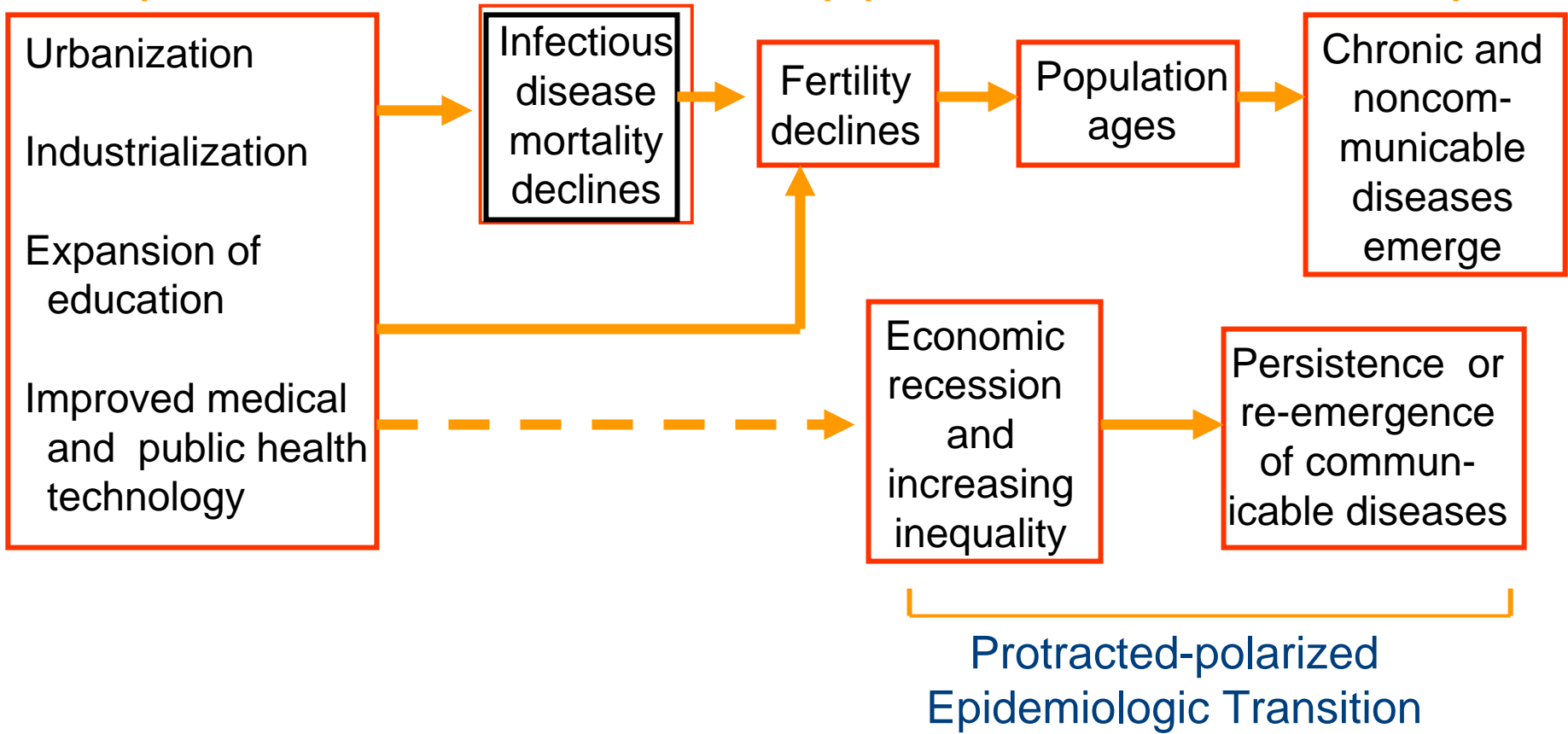
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- ◆ Upon completion of this module, the student will be able to:
  - Describe the recent trends and differentials in mortality
  - List and describe the proximate and underlying determinants of morbidity and mortality

# Health Transition

## Demographic Transition

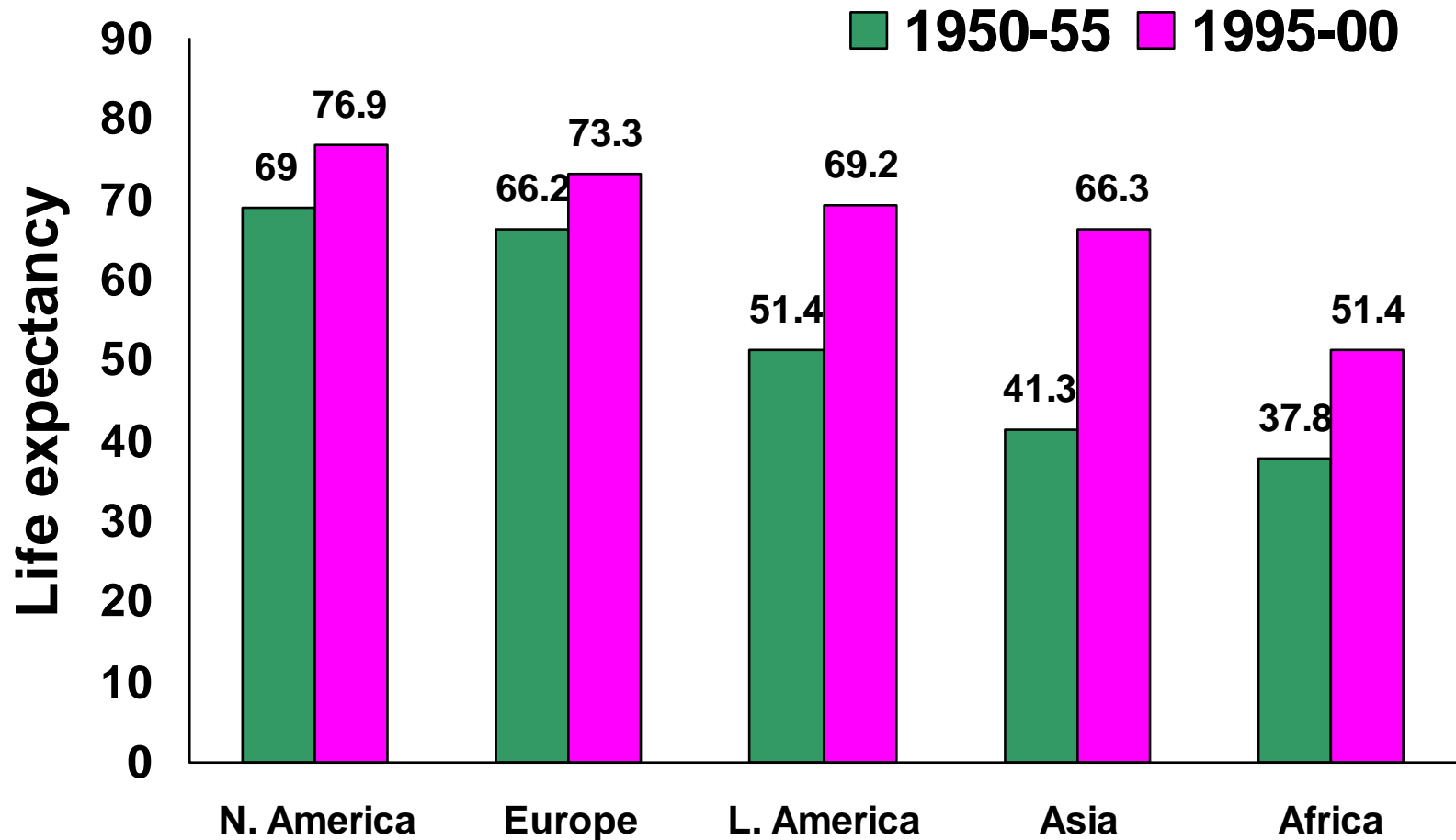
## Epidemiologic Transition



Relations Among the Demographic, Epidemiologic and Health Transitions

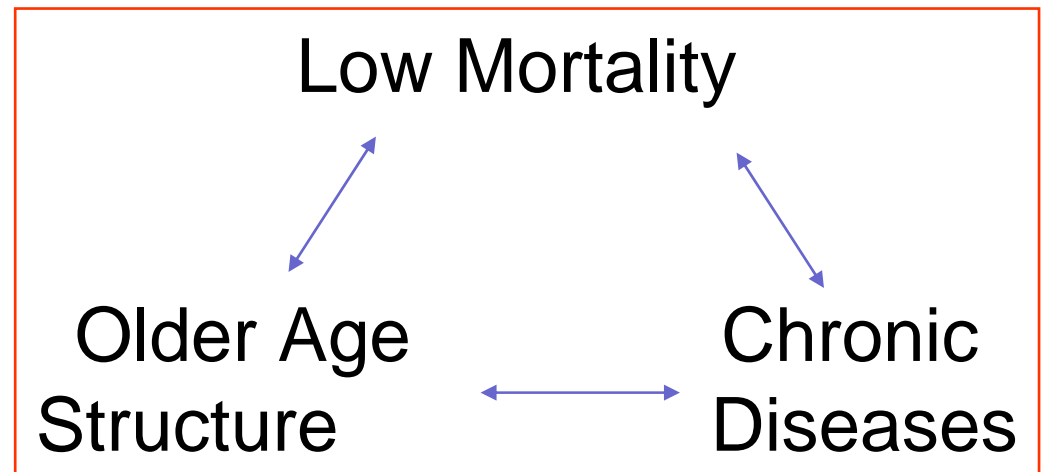
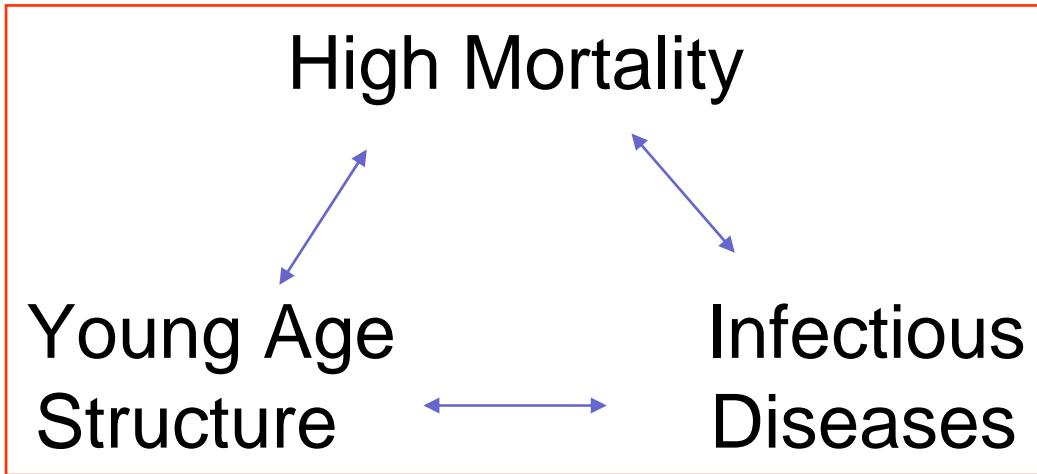
# Life Expectancy Gains in Major World Regions, 1950-55 to 1995-00

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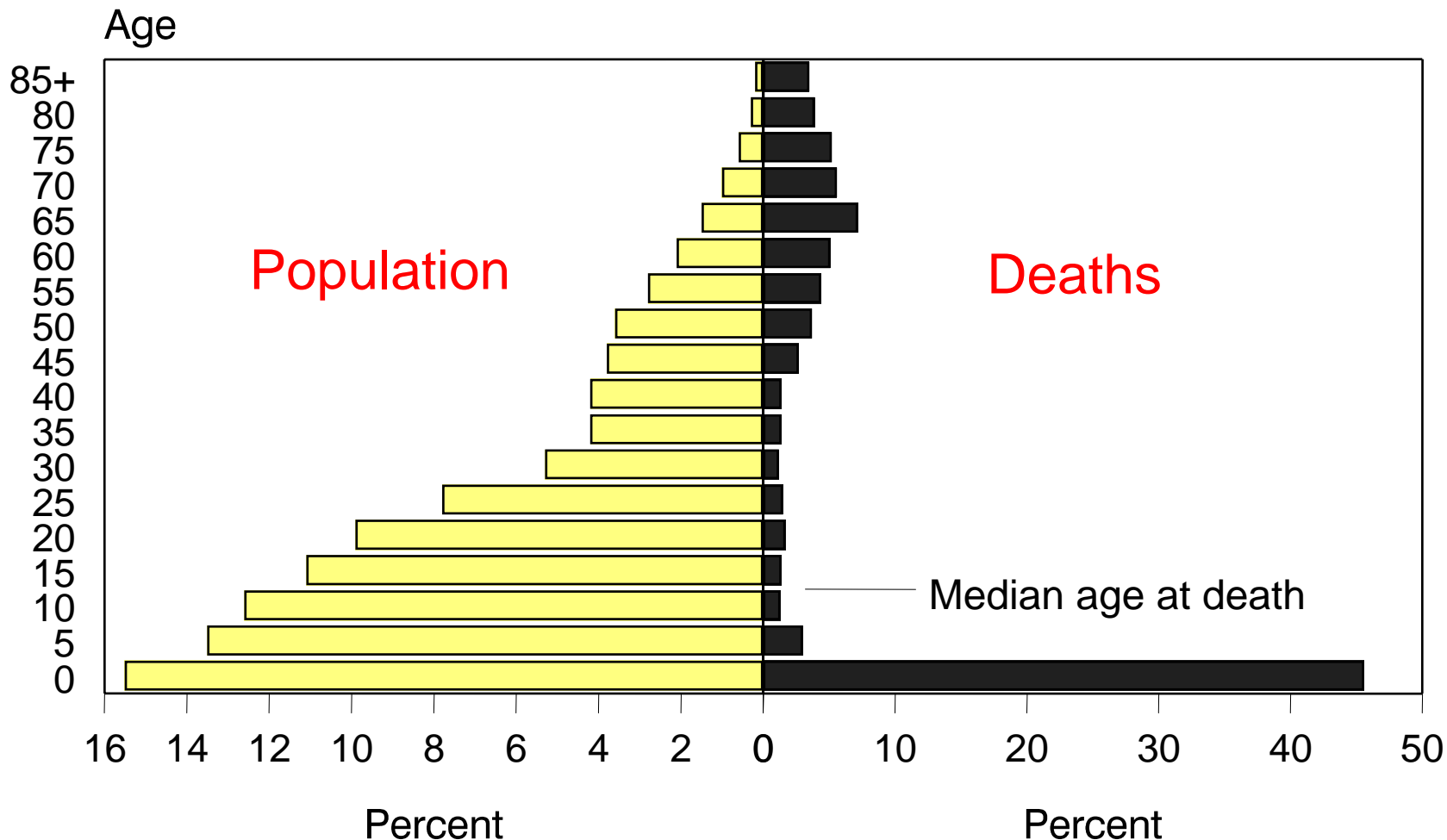
# The Structure of Mortality

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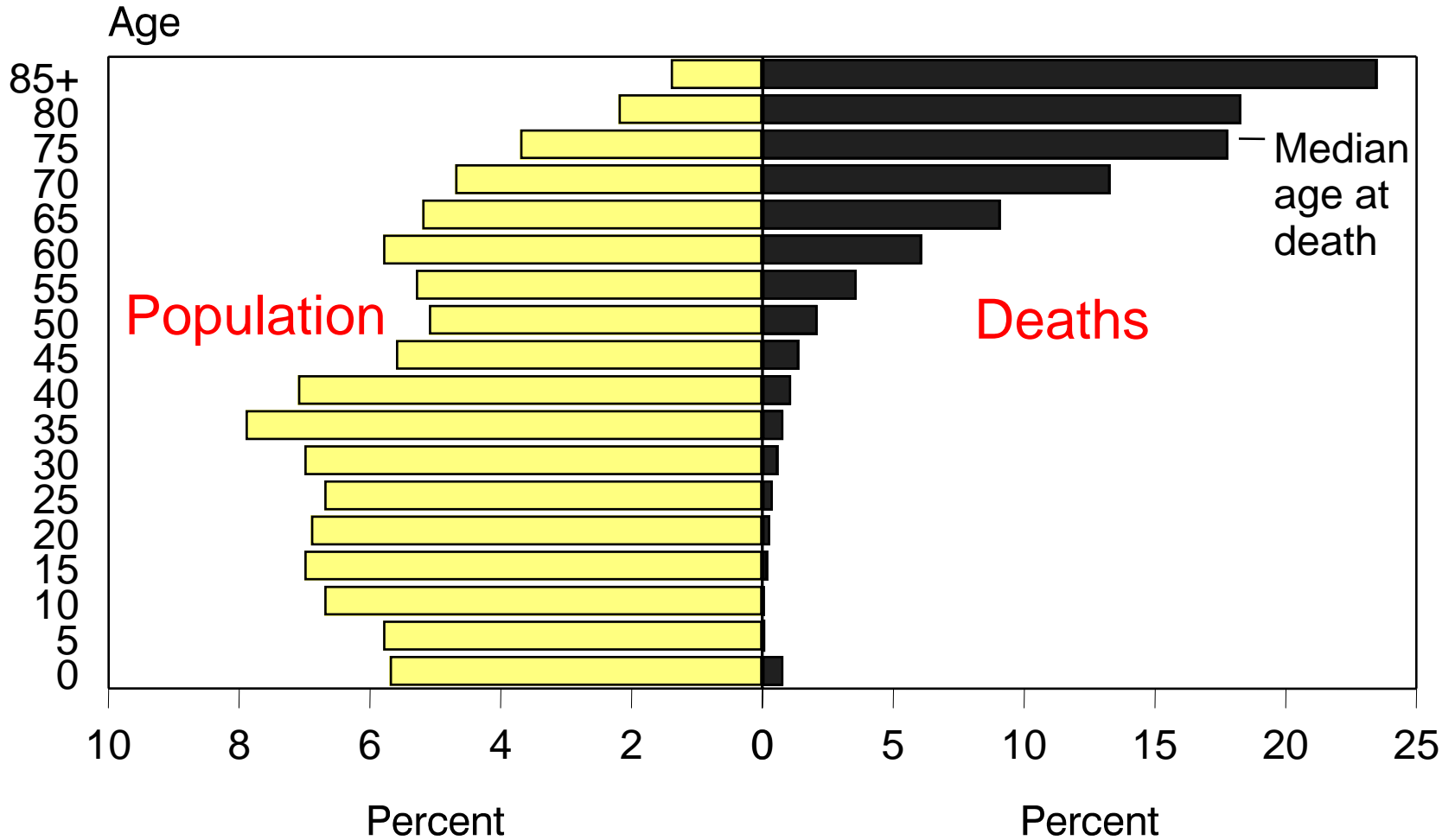
# Matlab, Bangladesh

Percent distribution of population and deaths, 1987



# Sweden

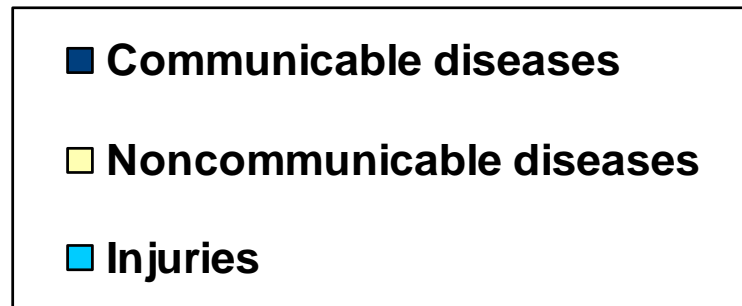
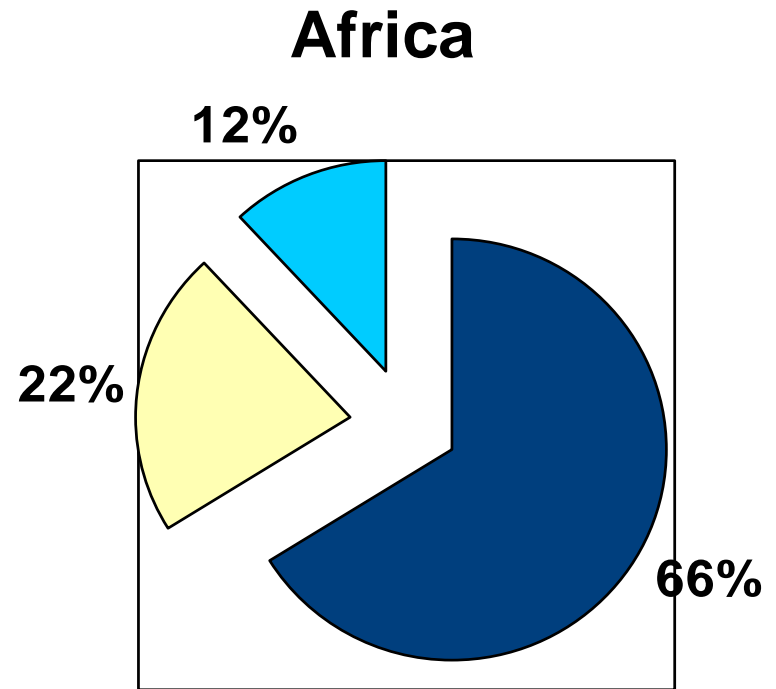
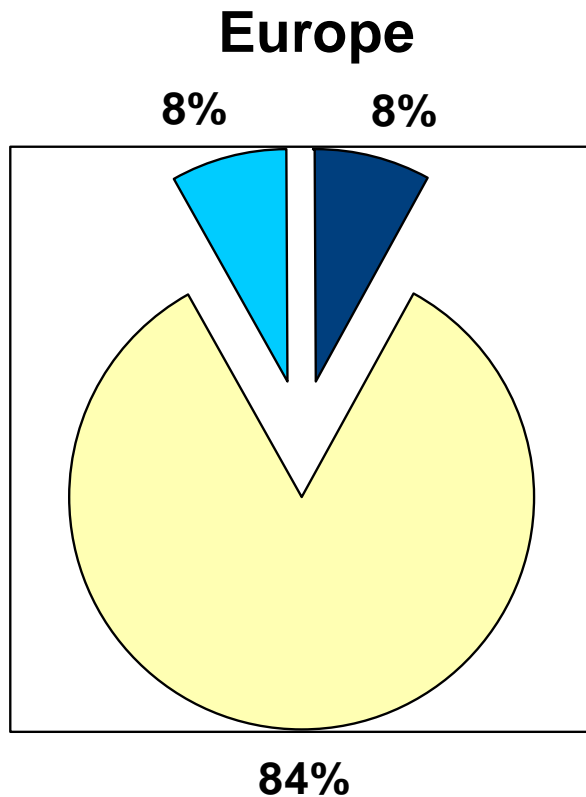
## Percent distribution of population and deaths, 1985



Data Source: Keyfitz and Flieger, 1990

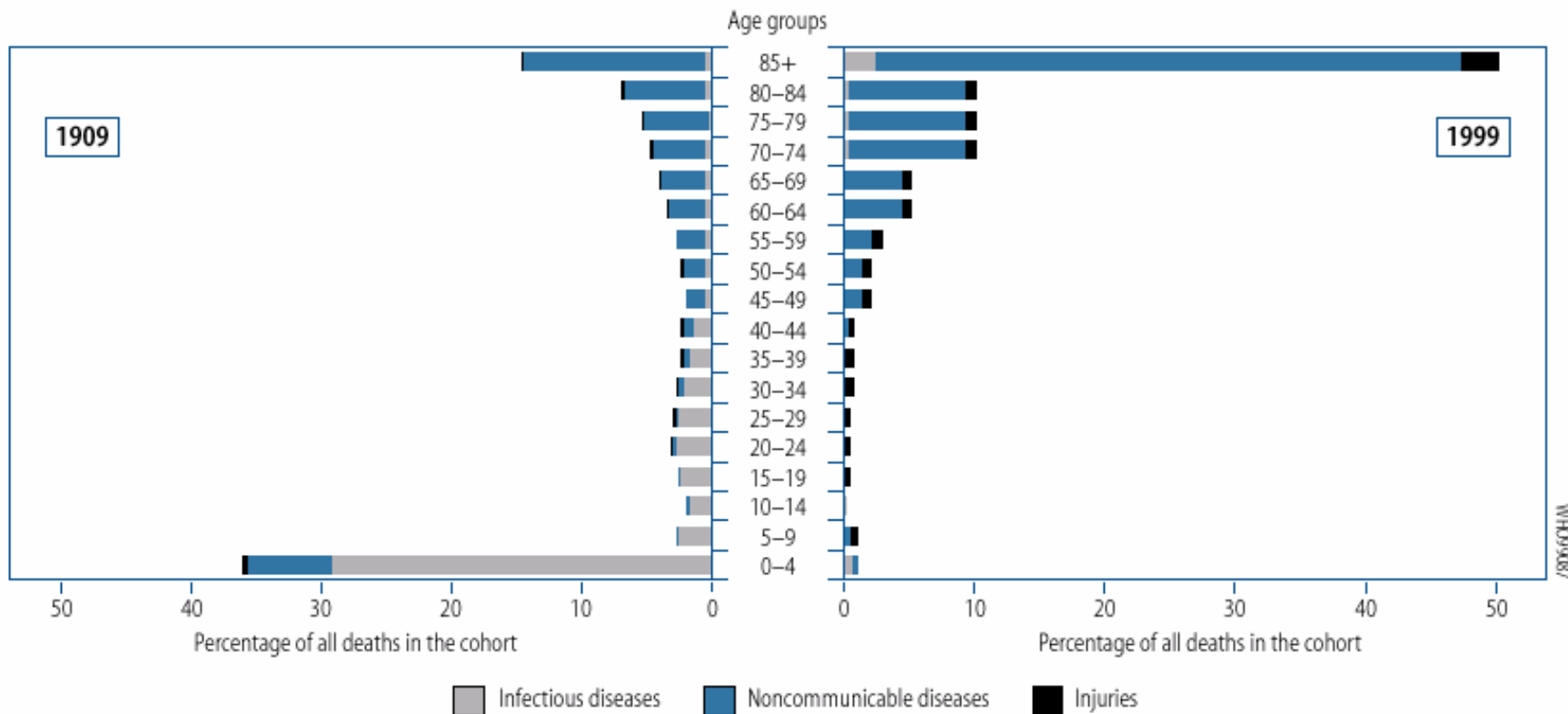


# Proportions of Deaths Due to Communicable and Non-communicable Diseases and to Injuries; Europe and Africa, 1998



*(Source: WHO, World Health Report, 1999)*

# Age and Cause Distribution of Deaths in Chile for Females 1909 and 1999



Source: Fig 1.1, World Health Report, 1999

# Determinants of Variations in Morbidity and Mortality

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- ◆ **Proximate determinants:** Factors that directly influence the risk of disease and the outcomes of disease processes in individuals.
- ◆ **Distal (underlying) determinants:** Social, economic, and cultural factors that influence the health status of a population by operating through one or more of the proximate causes.

# Proximate Determinants Of Morbidity and Mortality

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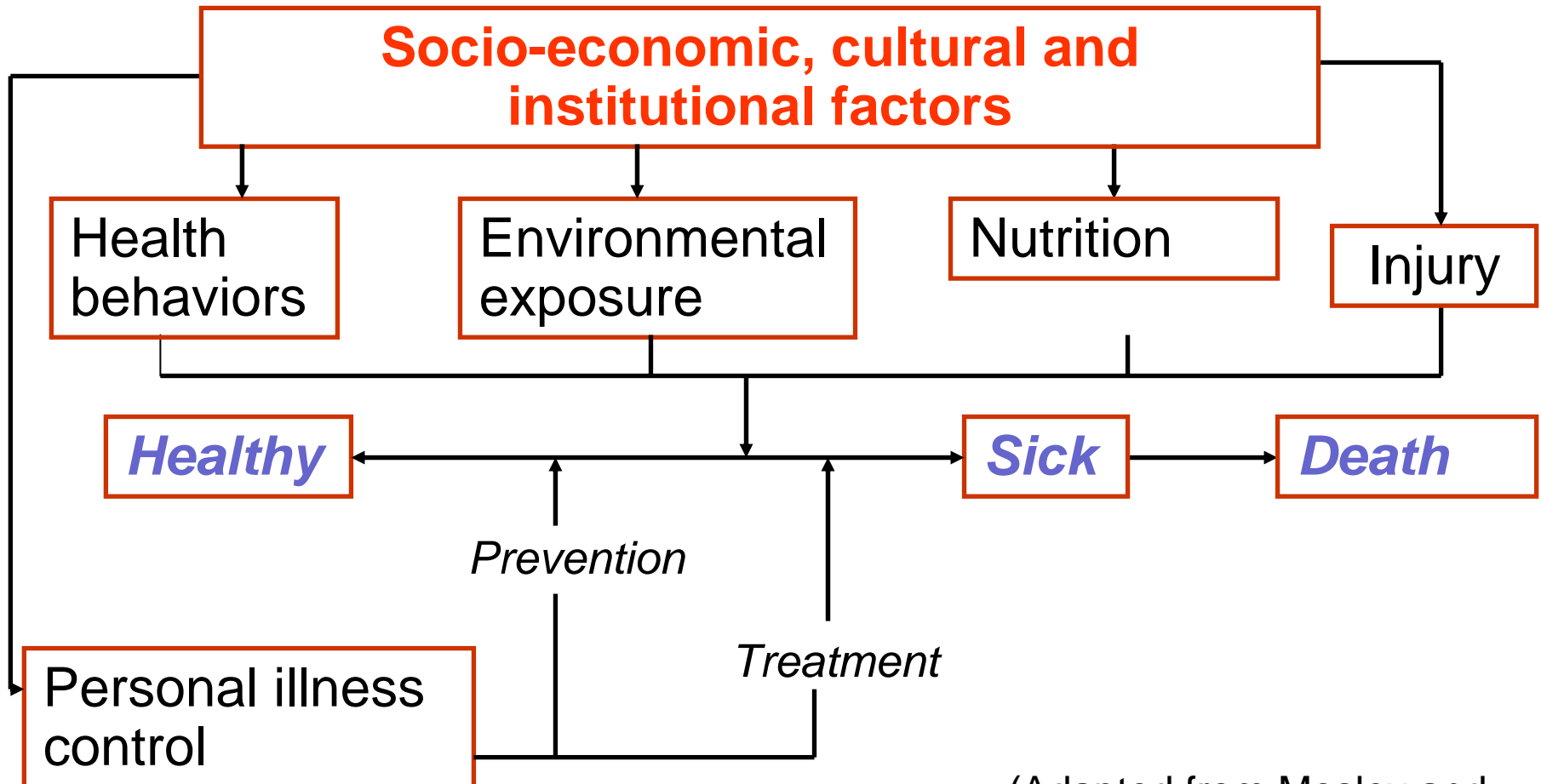
- ◆ *Personal behaviors*: Diet, hygiene, alcohol and tobacco use, sexual behavior, etc.
- ◆ *Environmental exposures*: Exposure to infectious or chemical or physical agents, occupational hazards, etc.
- ◆ *Nutrition*: Under nutrition, micronutrient deficiency, over nutrition/obesity etc.
- ◆ *Injuries*: Intentional or accidental injuries.
- ◆ *Personal illness control*: Specific preventive and sickness care actions.

# Underlying Determinants Of Morbidity and Mortality

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- ◆ *Socio-economic factors*: Household wealth, community development, women's education and employment, etc.
- ◆ *Institutional factors*: Health systems, health regulations, technological developments, information programs, environmental interventions, etc.
- ◆ *Cultural factors*: Traditional beliefs about health and disease, religious values, role and status of women etc.
- ◆ *Broader context*: Ecological setting, political economy, transportation and communication systems, agricultural development, markets, urbanization, etc.

# A Determinants of Morbidity and Mortality Framework



(Adapted from Mosley and Chen, 1983)

# Summary Slide

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- ◆ This concludes this lecture. The key concepts introduced in the lecture include:
  - Health transition
  - Regional trends in life-expectancy gains
  - Proximate and distal determinants of variations in morbidity and mortality

# **Mortality and Morbidity Trends and Differentials**

**Determinants and Implications for the  
Future**

**Module 7b**



# Learning Objectives

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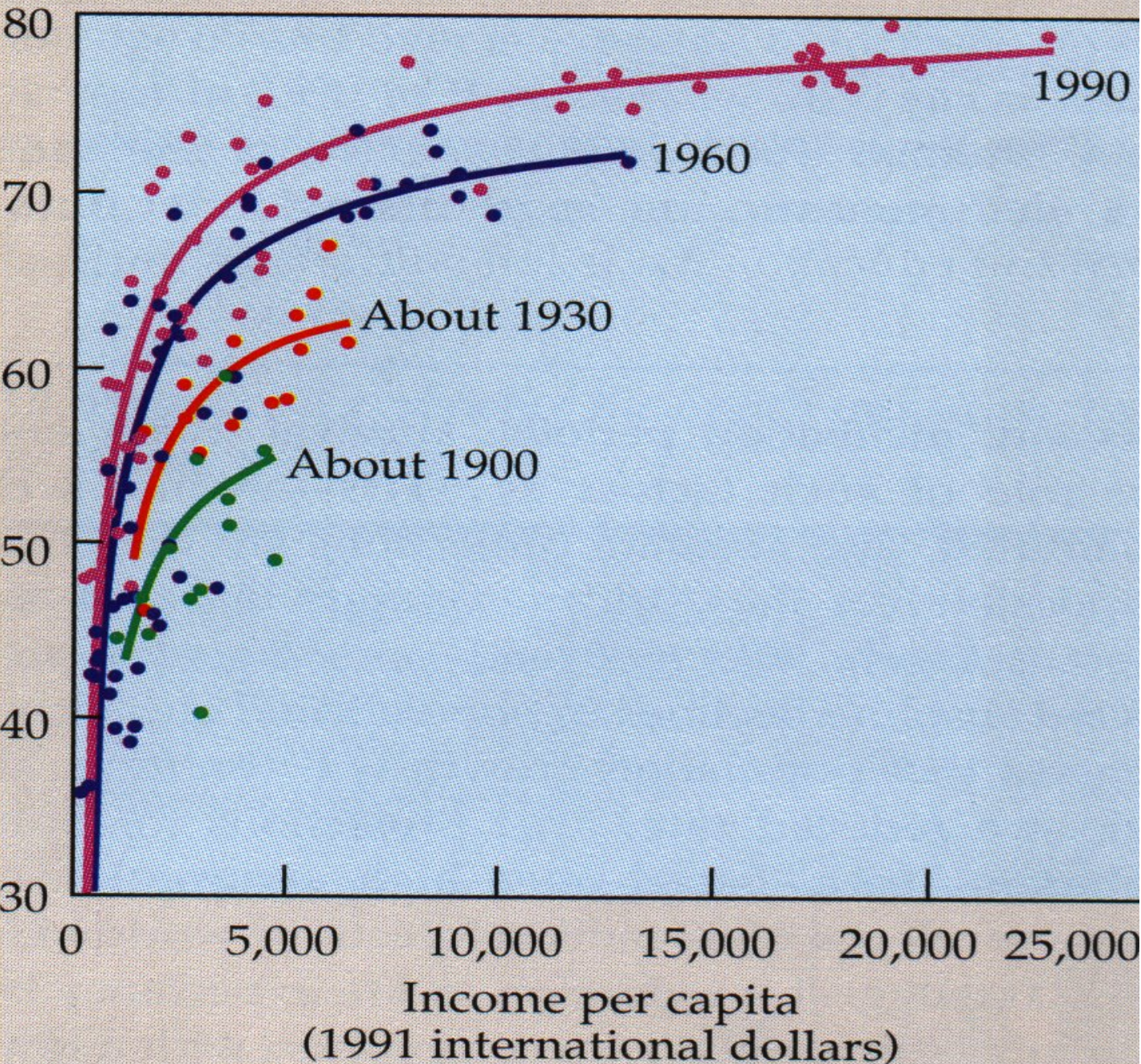
- ◆ Upon completion of this module, the student will be able to:
  - Analyze the relationship between indicators of development and health

# Income and Health – What Are the Relationships?

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- ◆ Historically – a dual relationship
  1. In a specific time period (e.g., 1900, 1930, 1960) higher incomes were associated with higher life expectancies.
  2. Over several decades, however, the same level of income was associated with a higher level of life expectancy.
  3. This gain in life expectancy over time without a corresponding change in income has been termed a “structural shift” by economists.

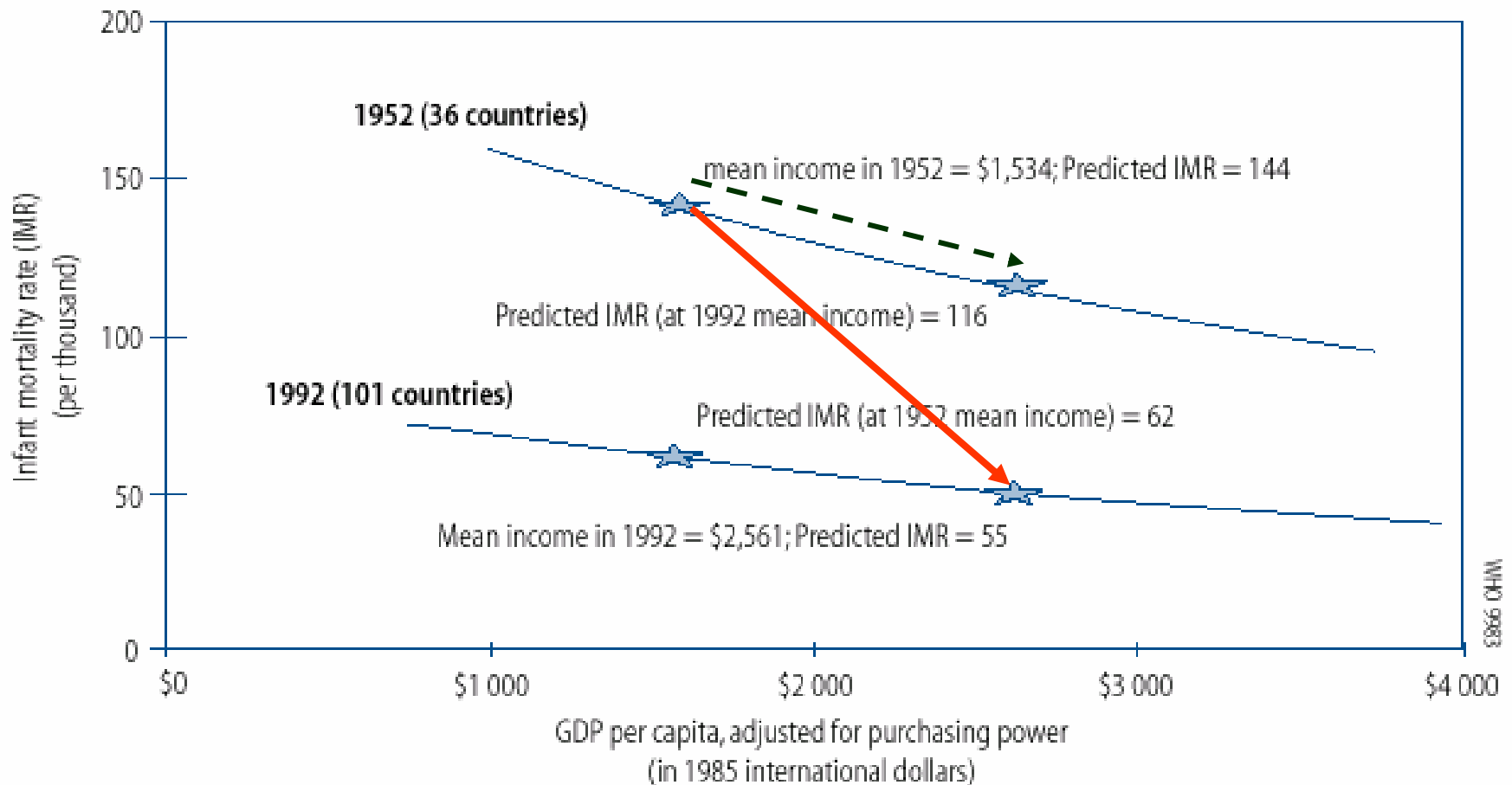
Life expectancy (years)



**“Structural shift” in the relationship between life expectancy and income, 1930-1990**

*Source: World Bank, World Development Report 1993*

# Structural Shift : Income And Infant Mortality Rates, 1952 - 1992



Source: Fig 1.4, World Health Report, 1999

# Income And Mortality: Explaining The Historical Relationships

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- ◆ Moving along the income/survival curve: Achieved by reducing health risks and being able to utilize the existing services more effectively with higher incomes.
- ◆ Shifting to a higher income/survival curve: Achieved by access to low cost and better health technologies (vaccinations, antibiotics, safe water and sanitation, vector control campaigns, information, etc.).
  - This was responsible for almost half of the gains in health between 1952 and 1992 in LDCs (WHO).

# Selected Developing Countries with High or Low Average Life Expectancies Relative to GNP Per Capita

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Country	GNP/capita US dollars (1988)	Life Expectancy Years (1990)	Total fertility rate (1990)	Percent literate	
				<u>Females</u> (1985)	<u>Males</u> (1985)

*A. Life expectancy over 70 years with GNP/capita under \$2,000*

Sri Lanka	420	71	2.5	81	92
Chile	1,510	72	2.7	92	93
Malaysia	1,940	70	3.7	65	83

*B. Life expectancy under 65 years with GNP/capita over \$2,000*

Saudi Arabia	6,200	64	7.1	43	69
Gabon	2,970	53	5.5	43	70
Algeria	2,360	64	5.4	35	63

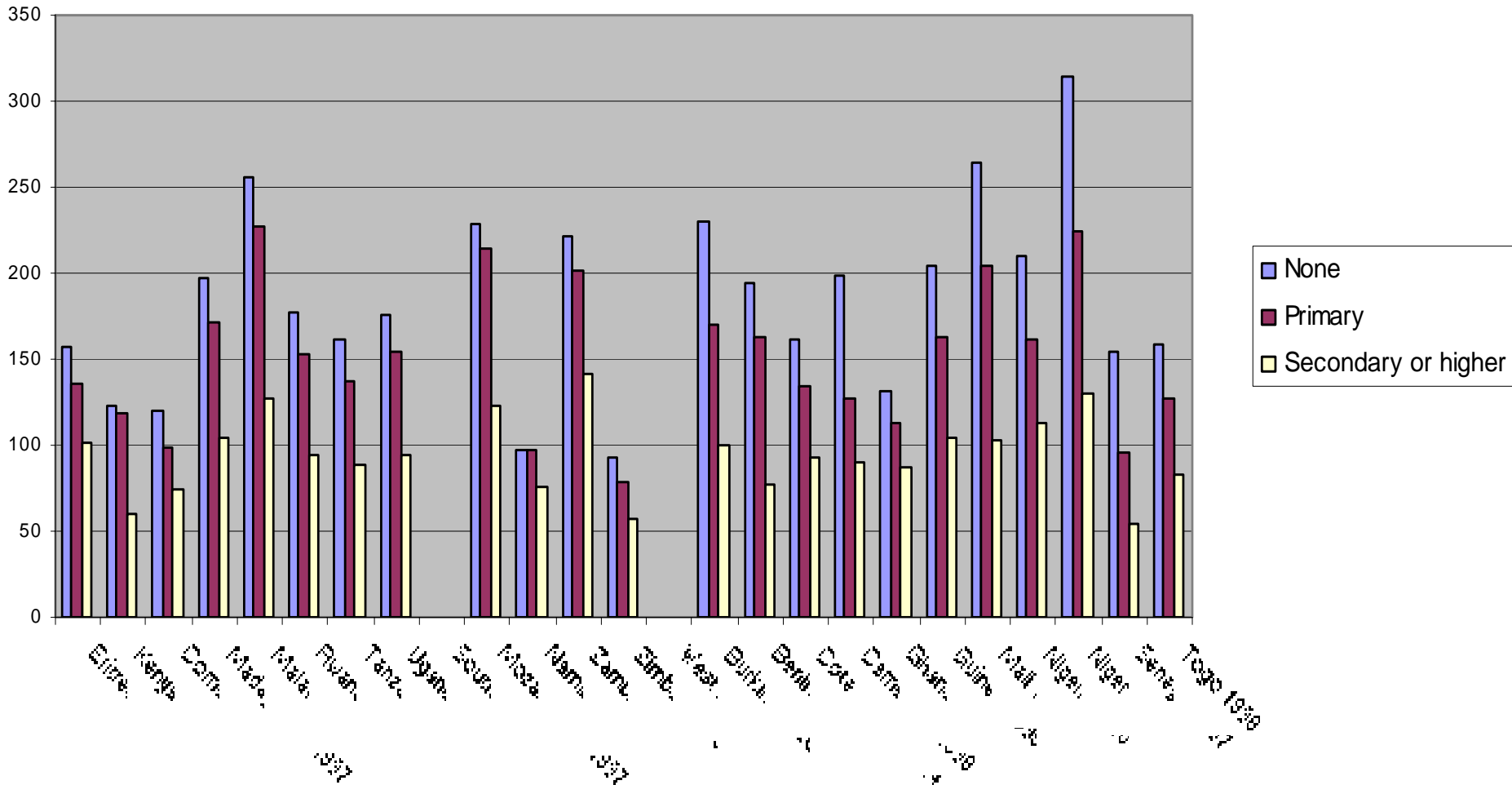
*(Source: Mosley and Cowley, 1991)*

# Female Education And Mortality

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- ◆ The Demographic and Health Surveys have documented a consistent relationship between higher maternal education and lower levels of mortality among children under 5 years of age.
- ◆ This has been observed in countries in Africa, Asia and Latin America.

# Under-five mortality rates by mother's education in the period 0-9 years preceding the survey, 1990-1999, DHS, SSA





# Female Education And Mortality

---

- ◆ Almost one-third of global health gains as measured by mortality reduction in the period 1960-1990 are attributed to gains in female education.
- ◆ This is been shown to operate in part through more educated mothers being able to reduce health risks and being better able to access modern health services.

# Summary Slide

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- ◆ This concludes this session. The key concepts introduced in the lecture include
  - Relationship between income and health
  - Relationship between woman's education and health

# **Mortality and Morbidity Trends and Differentials**

**Determinants and Implications for the  
Future**

**Module 7c**

# Learning Objectives

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- ◆ Upon completion of this module, the student will be able to:
  - Explain what is meant by the Health and Epidemiologic Transitions and Epidemiologic Polarization and what are the implications for the future

# The Epidemiological Transition: Elements

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- ◆ Shift in age structure of the mortality; from younger age groups to older age groups
- ◆ Change in patterns of mortality and morbidity by cause of death; from infectious diseases to non-communicable diseases

# The Epidemiological Transition: Historical Stages

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- ◆ The age of pestilence and famine
  - Precedes the mortality transition; LE = <40yrs
- ◆ The age of receding pandemics
  - Less variation in mortality with steady decline
- ◆ The age of degenerative or human-made diseases
  - Life expectancy reaches 70 years and above

*(Source: Omran, 1971)*

# The Epidemiological Transition: The Future?

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- ◆ The age of delayed degenerative diseases?
  - With health advancements, chronic diseases are postponed to much later in life
- ◆ The age of emerging/re-emerging infectious and parasitic diseases?
  - New infectious diseases (such as HIV/AIDS) may continue to appear and old diseases return because of antibiotic resistance and compromised immune systems among the elderly

# Epidemiological Polarization

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- ◆ Widening of the gap in the health status among social classes or geographical regions due to unequal distribution of gains of development and incomplete/ unequal coverage of health interventions.

*continued*



# Epidemiological Polarization

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- ◆ Can refer to widening of the health status gap between countries or between social groups within a country
- ◆ Characterized by overlap of eras; persistence of infectious diseases with emergence of non-communicable diseases
- ◆ Observed in the developed and developing countries alike.

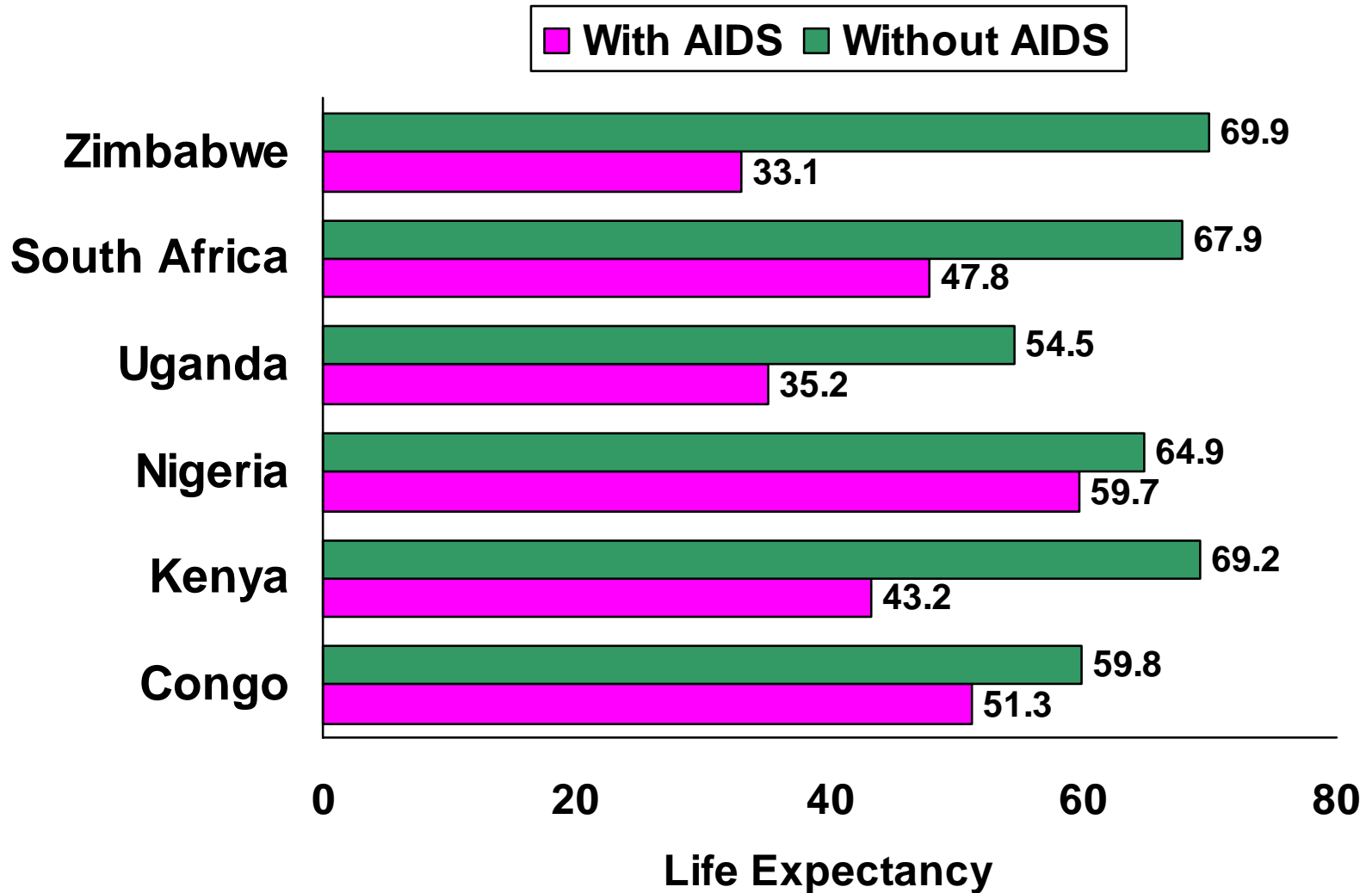
*continued*

# Epidemiological Polarization

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- ◆ Mortality “reversals” due to economic collapse, wars and emerging epidemic diseases can be factors causing widening gaps across countries. Examples are:
  - Economic collapse – Russia (Former Soviet Union)
  - Wars – Former Yugoslavia, Rwanda
  - Emerging epidemics – HIV/AIDS in Sub-Saharan Africa

# Projected Effect of AIDS on Life Expectancy in Sub-Saharan Africa by the Year 2010



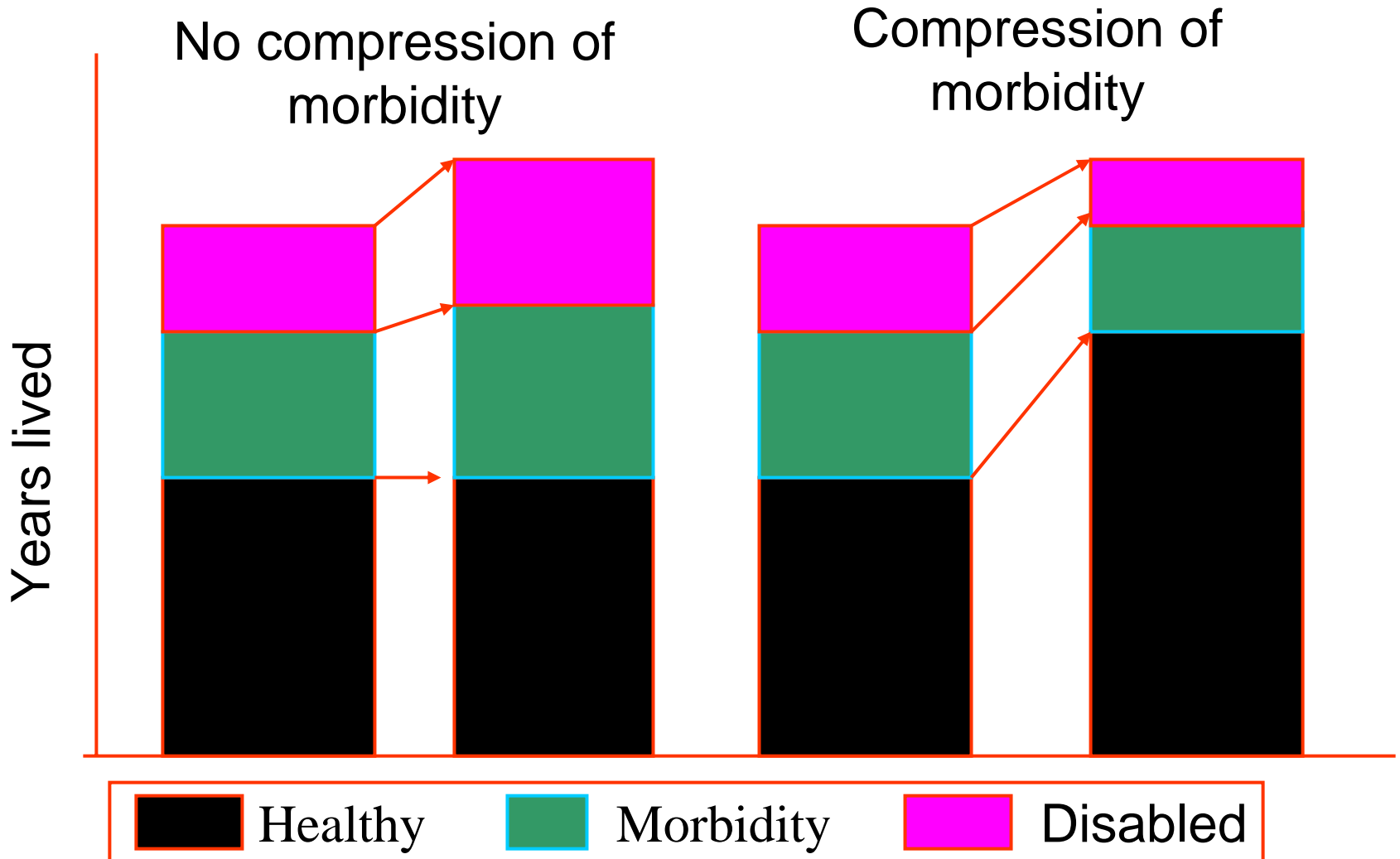
Source: U.S. Bureau of Census International Programs, 1997

# Population Aging and “Compression” of Mortality and Morbidity

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- ◆ Compression of mortality : Increasing concentration of deaths at upper ages
  - *Is there an upper limit to life expectancy?*
- ◆ Compression of morbidity: An increasing concentration of illness and disability in the latter years of life with fewer years of disabled life before death among the elderly
  - *Are health gains matching or exceeding gains in survival?*

# Compression of Morbidity with Gain in Life Expectancy



# Population Aging and “Compression” of Mortality and Morbidity

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- ◆ If there is no “compression” of mortality, and no postponement of morbidity, then life expectancy may steadily increase but years lived with morbidity and disability would also increase.
- ◆ This can result in growing numbers of chronically ill and disabled elderly, creating an increasing burden on health systems.

# Summary Slide

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- ◆ This concludes this lecture. The key concepts introduced in this lecture include:
  - Epidemiological transition
  - Epidemiological polarization
  - Compression of mortality and morbidity